recognition interface system **10**, or at periodic intervals. As an example, a calibration routine can be merely a prompt for a user to touch specific points that have predetermined locations on the light-diffusive screen **20** with an end-point of the input object **22**. The calibration unit **26** could be a separate system working in conjunction with the controller **24**, or could merely be a software routine residing within the controller **24**.

[0021] The gesture table **16** also includes a projector **28** configured to project visual content onto the underside of the light-diffusive screen **20**. The visual content can include an output interface, such as, for example, computer monitor data, with which the user can interact and provide inputs. Because the IR light sources **18** do not illuminate visible light, the IR illumination does not interfere with the visual content projected from the projector **28**. The user can thus employ the input object **22** directly onto the monitor data to simulate inputs, such as, for example, mouse inputs. As an example, the controller **24** could interpret two-dimensional motion of an end-point of the input object **22** across the light-diffusive screen **20** as a mouse cursor, which can be projected as part of the monitor data by the projector **28**. Furthermore, as another example, by determining the three-dimensional physical location of the end-point of the input object **22**, the controller **24** could interpret a touch of the light-diffusive screen **20** by the end-point of the input object **22** as a left mouse-click. Accordingly, a user of the gesture recognition interface system **10** could navigate through a number of computer menus associated with a computer merely by moving his or her fingertip through the air above the light-diffusive screen **20** and by touching icons projected onto the light-diffusive screen **20**.

[0022] As will be apparent in the following discussion, the gesture recognition interface system **10** in the example of FIG. **1** is intended to represent but one example of a gesture recognition interface system. For example, the gesture recognition interface system **10** demonstrates two IR light sources **18**. However, it is to be understood that any number of IR light sources **18** can be implemented, and in any position beneath the light-diffusive screen **20**. In addition, the IR light can be provided from another source other than the IR light sources **18**. As an example, in addition to projecting the visual content, the projector **28** can be configured to emit IR light, such as based on removing an IR filter associated with the projector **28**. As a result, the projector **28** can function both to project the visual content and to provide the IR illumination to the underside of the light-diffusive screen **20**.

[0023] As another example, the gesture recognition interface system **10** could include more than two cameras that each supply respective silhouette images of the input object **22** to the controller **24**. For example, the gesture recognition interface system **10** could include multiple pairs of cameras that each generate matched images of different areas of the light-diffusive screen **20**. In addition, the example of FIG. **1** demonstrates that the projector **28** projects the visual content to the underside of the light-diffusive screen **20**, such that the visual content is displayed as a rear-projection. However, it is to be understood that the projector **28** can be configured to project the visual content from above the light-diffusive screen **20**, such as centered between the cameras **12** and **14**. As yet another example, the IR light sources **18** may not illuminate in the IR spectrum, but could instead illuminate in a different spectrum, such as narrow frequency bands of visible light, with each of the respective cameras **12** and **14** having a corresponding spectrum filter. Furthermore, it is to be understood that the light-diffusive screen **20** need not be horizontal, but that the gesture table **16** can be configured such that the light-diffusive screen **20** could be oriented at a tilted angle (e.g., approximately 45°) for ergonomic and/or presentation purposes. Accordingly, the gesture recognition interface system **10** can be configured in any of a variety of ways.

[0024] FIG. **2** illustrates another example of a gesture recognition interface system **50** in accordance with an aspect of the invention. The gesture recognition interface system **50** can be a portion of the gesture recognition interface system **10** in the example of FIG. **1**. As such, reference is to be made to the example of FIG. **1** in the following discussion of the example of FIG. **2**.

[0025] The gesture recognition interface system **50** includes the controller **24**, the first camera **12**, and the second camera **14**. The first and second cameras **12** and **14** each receive a plurality of images of the input object **22**, such as a user's hand. The respective images of the input object **22** could be silhouette images that are based on a brightness contrast between the substantially dark input object **22** in the foreground of the bright IR illumination that is diffusely emitted from the top-surface of the light-diffusive screen **20**.

[0026] The first and second cameras **12** and **14** each input their respective images of a matched pair of images into a digitizer **52**. The digitizer **52** produces digitized versions of the images of the input object. The digitized images of the input object **22** are input to an image comparator **54**. The image comparator **54** compares each of the digitized images of the input object to a previously stored digitized image of the input object to generate a binarized image of the input object **22**. As an example, although the light-diffusive screen **20** emits the IR illumination in a substantially more uniform manner, there may still be illumination intensity gradients across the light-diffusive screen **20**. Therefore, the comparison by the image comparator **54** allows for an improved quality of the digitized images despite variations in illumination intensity across the light-diffusive screen **20**. As an example, the previously stored digitized image could have been captured during a calibration operation and/or from repeatedly storing the digitized image in memory buffers.

[0027] As an example, a background model can be maintained for each of the cameras **12** and **14** without the input object **22** being present. The background model images can be used to decide at each pixel whether the images of the input object **22** correspond to a binary 1 or 0. For example, at each pixel location, if the image of the input object **22** has a value that is approximately greater than the corresponding background model image times a threshold scaling value of between 0 and 1, the output value will be a binary 1, thus denoting the presence of the input object **22**. In this manner, the scaling value can be selected to provide an optimal balance between desirably detecting the input object **22** while being substantially insensitive to residual variations in illumination intensity from the top-surface of the light-diffusive screen **20**. As a result, edges associated with the input object **22** can be detected in each of the images.

[0028] The contrast enhanced binarized silhouette images of the input object **22** are then each input to an object detection algorithm device **56**. The object detection algorithm device **56** can be an integrated circuit (IC) or set of ICs within the controller **24**, or could be a software routine residing in the controller **24**. The object detection algorithm device **56** can